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This tutoring experiment was conducted to provide a place outside of regular school hours where students could receive additional instruction and practice, and to create an experimental situation in which the effectiveness of a tutoring program at the secondary school level could be evaluated.

Tutoring was done by junor and senior students from the high school, and participation in the program was voluntary. Tutoring sections of three to five students met twice weekly. Tutors were urged to experiment with their choice of techniques. Those most frequently used included exercise and drill, question-answer, special assignments, assistance with homework and providing quiet study with assistance when needed. Control groups were carefully matched, and four hypotheseswere tested on the basis of teacher ratings. This method was chosen over administering standard tests, because the purpose of the study was to measure classroom performance, and the hypotheses to be tested included attributes such as motivation and interest.

In spite of having volunteered for the program, participating students were rated as having less motivation than those of the control group. On the basis of rated performance, the first hypothesis (that tutored students will show greater improvement on classroom examinations and quizzes than non-tutored students) was rejected. The remaining three were confirmed. Tutored students showed: 1) greater improvement on reports, essays, homework exercises, and other classroom assignments; 2) increased motivation and interest in the subject; and 3) improvement in study habits when compared with non-tutored students.

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EFFECT OF TUTORING ON PERFORMANCE AND MOTIVATION RATINGS IN SECONDARY SCHOOL STUDENTS

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EFFECT OF TUTORING ON PERFORMANCE AND MOTIVATION RATINGS IN SECONDARY SCHOOL STUDENTS

The purpose of this study is to examine the effects of an experimental tutoring program conducted during the 1963-64 school year in an urban comprehensive high school of approximately 2100 students.

The tutoring program was begun in February 1964 as a part of the Oakland Public Schools Interagency Project, an experimental program partially financed by the Ford Foundation. The purposes of this tutoring experiment were (1) to provide a place outside of regular school hours where students could receive additional instruction and practice, and (2) to create an experimental situation in which the effectiveness of a tutoring program at the secondary school level could be evaluated.

Students participated in the program on a voluntary basis. Interested teachers explained the program to their classes, obtained the names of volunteers, and supervised the tutors assigned to their sections. Tutoring sections involving from 3 to 5 students were scheduled twice weekly and were conducted by 30 junior and senior students from the high school student body. Supervising teachers and tutors were not given specific instructions for organizing their tutoring sections, but instead were encouraged to develop and experiment with their own tech-

niques which best suited the subject matter, tutor, and students in the section.

Problem

An empirical investigation was designed to (1) measure the effectiveness of the tutoring program as a teaching tool for improving performance on classroom tests and assignments, increasing motivation and interest, and improving study habits, and (2) develop and test evaluation techniques and measuring instruments which could be applied to a full scale study to be conducted at a later time. From this, four general hypotheses were selected for an empirical test.

Hypothesis One states that tutored students will show greater improvement on classroom examinations and quizzes than non-tutored students.

Hypothesis Two states that tutored students will show greater improvement on reports, essays, homework exercises, and other classroom assignments than non-tutored students.

Hypothesis Three states that tutored students will show increased motivation and interest in the subject when compared with non-tutored students.

Hypothesis Four states that tutored students will show improvement in study habits when compared with non-tutored students.

Procedure

The study was conducted during the period February 1, to June 1, 1964. As the following table indicates, the tutoring techniques used and determined to be most effective by supervising teachers and tutors varied with the subject matter. It should

be noted, however, that several tutors reported that they applied a combination of two or more of the listed techniques.

TABLE I--Instruction Techniques Employed by Student Tutors in Math, Language, and Science

Tutoring Technique	Math	Language	Science
Exercise and Drill	4.2% (1)	40.0% (8)	33.3% (2)*
Question-Answer	20.8 (5)	20.0 (4)	50.0 (3)
Special Assignments	4.2 (1)	10.0 (2)	-
Assist with Homework	33.4 (8)	15.0 (3)	-
Provide Quiet Study Assisting Student as Needed	29.2 (7)	5.0 (1)	-
Other	8.3 (2)	10.0 (2)	16.7 (1)

*Values in parentheses are N's

Other techniques noted by tutors included engaging students in conversation in French or Spanish, review of previous day's work, preparing students for examinations, and conducting critiques of daily and weekly tests.

Tutoring sections were homogeneous, i.e., all of the students in a section were taken from the same class and teacher and, therefore, the progress of the tutored students could be compared with classroom controls who had not been tutored but had been exposed to the same teacher and teaching techniques, textbooks, assignments, lectures, and classroom milieu simultaneously. No subject in this study attended more than one tutoring section.

This common classroom experience formed the basis for further matching. Tutored students were paired with non-tutored classroom controls by sex, chronological age, and total scores on

a scholastic aptitude test. In February, 1964, age and test data were collected for students participating in the tutoring program, forming a population from which experimental subjects would be drawn. The same data were collected for the classroom controls as for the experimental subjects. The standard test used for matching was the School and College Ability Test which had been administered to all participating students within one year previous to the study.

After pairing, experimental and control subjects were rated by their teachers. Students' performance on classroom examinations and quizzes, reports, essays, homework, and other assigned activities, based upon an average computed by the teacher from grades entered in his record book, was rated on a five-point "A" through "F" scale. Motivation and study habits were rated by the teacher on a four-point scale, "poor," "fair," "good," and "excellent." Classes in this school were conducted for one year rather than for a semester and, thus, this initial evaluation reflected an entire semester's work. In June a second and final rating of the students' progress was completed by the same teacher using the same rating scale but on a second copy of the rating form. Thus, not only did the teacher lack a record of his initial evaluation, but approximately 16 weeks separated the initial and final evaluations.

This method was considered preferable to the administering of standard achievement tests is specific subject areas before entering and after completing the program because (1) the purpose of this study was to measure changes in classroom performance, and (2) the hypotheses to be tested included attributes such as motivation and interest not directly reflected in standard achievement test scores.

Sample

The population yielded two samples or 25 pairs, 10 girls and 15 boys, undergoing tutoring in mathematics (10), language (2), and science (13). Subjects included in these categories were advanced math, algebra, geometry, Spanish, English, and physiology. Table II shows the report card grades (second marking period) of experimental and control subjects upon entering the tutoring program.

TABLE II--Distribution of Grades for Experimental and Control Groups in Tutored Subjects at Initial Evaluation

Group	A	B	C	D	F	N
Experimental	-	-	10	8	7	25
Control	-	2	11	6	6	25

Table III establishes further the comparability of experimental and control subjects on the matching variables, confirming the accuracy of the matching process and fixing the baseline for comparisons.

TABLE III--Means and Standard Deviations of Age and SCAT Total Scores for Experimental and Control Subjects

Group	SCAT Test		Age		
	X	S.D.	X	S.D.	N
Experimental	284.36	13.33	16.39	.865	25
Control	284.48	12.71	16.38	.851	25

The relative motivation of the experimental and control groups is a crucial variable in this study because of the bias introduced into the selection process, i.e., experimental sub-

jects were volunteers. If the experimental group were indeed more highly motivated, as their volunteering would seem to indicate, this intervening variable would seriously affect if not preclude the forming of conclusions from this study. Table IV compares the motivation of the two groups as rated by their teachers at the beginning of the study.

TABLE IV--Motivation Ratings of Experimental and Control Groups on Initial Evaluation (N=25)

Group	Motivation Rating			
	Poor	Fair	Good	Excellent
Experimental	24% (6)	32% (8)	40% (10)	4% (11)
Control	8 (2)	28 (7)	32 (8)	32 (8)

Chi Square=11.32

It was found that 24 percent of the experimental group were considered by their teachers to exhibit "poor" motivation as compared with 8 percent in the control group. Conversely, teachers rated 32 percent of the control group as having "excellent" motivation compared with only 4 percent so rated in the experimental group. Application of the Chi Square test indicates at the .05 level of significance that subjects who volunteered for the tutoring program show less motivation in the classroom than the non-volunteers. That the majority of the students in the experimental group did in fact volunteer was confirmed in a later survey of these students in which 64 percent indicated that they "decided for themselves" as opposed to only 36 percent who were asked by their teachers or felt compelled to join.

Thus, with this step it appears that the variables that would seriously affect this study have been identified and investigated.

With the exception of the motivation factor, it may be assumed that both samples came from the same population.

Findings

In testing the four hypotheses the measure of difference between the two groups was the appearance of a significant increment or decrement in ratings before and after tutoring. The lack of grading standards and the subjective nature of the discrete "F" through "A" and "poor" through "excellent" grading scales made it necessary to devise a scale indicating direction rather than magnitude of change. For this study, then, the relevant dimension was indication of an increment (+), no change (0), or decrement (-) in rated performance.

The first hypothesis tested was: "tutored students will show greater improvement on classroom examinations and quizzes than non-tutored students." Table V compares the rated performance of the two groups.

TABLE V--Performance of Experimental and Control Groups on Classroom Examinations and Quizzes (N=25)

	Experimental	Control
(+)	7	6
(0)	15	14
(-)	3	5

Chi Square= .610

Although one more experimental subject than control raised his grade on examinations and quizzes and more controls than experimental subjects dropped a grade or more, the difference was not

significant at the .01 level. Therefore, Hypothesis One was rejected.

Because four comparisons were to be made from the observed data, an experiment-based error rate was determined to control the probability of a Type I error for the entire experiment. Thus, each of the four comparisons was tested at the .01 significance level to provide an error rate experimentwise of .04 (Ryan, 1962).

The second hypothesis tested was: "tutored students will show greater improvement on reports, essays, homework exercises, and other classroom assignments than non-tutored students." Comparisons for the two groups on this dimension are presented in Table VI.

TABLE VI--Performance of Experimental and Control Groups on Reports, Essays, Homework, and Other Classroom Assignments (N=25)

	Experimental	Control
(+)	11	1
(0)	12	19
(-)	2	5

Chi Square=11.6

Experimental subjects, seeking the assistance of their tutors in preparing their assignments, performed better than the controls. The difference was significant at the .01 level and Hypothesis Two was confirmed.

The third hypothesis to be tested was: "tutored students will show increased motivation and interest in the subject when compared with non-tutored students." The results of this test

follow in Table VII.

TABLE VII--Motivation Ratings of Experimental and Control Groups (N=25)

	Experimental	Control
(+)	11	0
(0)	10	17
(-)	4	8

Chi Square=15.26

Teachers rated 11 of the tutored students as having improved in motivation and interest, while none of the non-tutored students were so rated. In fact, an actual decrement in motivation was noted in more subjects of the control group. Again, these differences were significant at the .01 level and Hypothesis Three was confirmed.

The fourth hypothesis tested stated: "tutored students will show improvement in study habits when compared with non-tutored students." Table VIII shows the results of this test.

TABLE VIII--Study Habit Ratings of Experimental and Control Subjects (N=25)

	Experimental	Control
(+)	15	5
(0)	9	12
(-)	1	8

Chi Square=10.40

These differences are also significant at the .01 level and Hypothesis Four was confirmed.

Summary and Discussion

The confirmation of three of the four hypotheses tested lends support to the value of the tutoring program developed and points to a positive correlation between the attributes measured and tutoring. Although 54 percent of the tutored students entered the program with motivation ratings of "poor" or "fair" (Table IV), the hypotheses confirmed point to the following conclusions: (1) tutored students show greater improvement on reports, essays, homework exercises, and other classroom assignments than did non-tutored students, (2) tutored students showed increased motivation and interest in the subject when compared with non-tutored students, and (3) tutored students showed greater improvement in study habits when compared with non-tutored students. The rejection of Hypothesis One leads to the conclusion that there was no difference between tutored and non-tutored students on examinations and quizzes.

Beyond these conclusions the observed data make possible further observations. Though the reader will tend to emphasize the "increment" cells of the tables, particular attention should be directed to the decrement dimension. In each case; classroom assignments, motivation and interest, and study habits, teachers noted an apparent worsening of performance in the non-tutored group. The larger number of controls whose rating dropped during the study would suggest that as the semester progresses and the subject content becomes more difficult, the tutored group is better able to keep up with and learn the new material. Exam-

ination of Chi Square values for each test show the largest differences to lie in the (+) Experimental and (-) Control cells.

The question of just how tutoring affects these variables was not part of this study, however, the data do indicate a possible influence of tutoring directly on study habits and, thus, indirectly on classroom assignments and motivation. The tutors' emphasis on exercise-drill and question-answer techniques (Table I) suggests that the student may have actually received weekly demonstrations of study methods which he himself then applied at home and in the classroom. There arises, then, an interesting question of whether perhaps procedural techniques rather than subject content were being transferred to the student.

The limited scope of this study has prevented the investigation of several interesting questions suggested by the findings. The results, however, were positive, encouraging further experimentation and inviting a closer look at tutoring programs in secondary schools.

Reference

Ryan, Thomas A. "The Experiment as the Unit for Computing Rates of Error." Psychological Bulletin, 59: 301-305, 1962.